

What is claimed is:

1. An electronics enclosure, comprising:
a cylindrical body; and
one or more modular card cages, adapted to receive one or more electronic circuit cards, including:
an outer frame member in contact with an inner wall of the cylindrical body sufficient to dissipate unwanted heat;
an inner frame member;
one or more support members coupled between the outer frame member and the inner frame member; and
a plurality of electronic device retainers adapted to couple to the modular card cage and hold each of the one or more electronic circuit cards in contact with one of the one or more support members;
wherein the support members provide an isolated heat dissipation path for heat, produced by each of the one or more electronic circuit cards, to be removed from the enclosure.
2. The enclosure of claim 1, wherein the one or more support members comprise one or more wedge shaped support members.
3. The enclosure of claim 2, wherein the one or more wedge shaped support members is hollow.
4. The enclosure of claim 2, wherein the one or more wedge shaped support members is solid.
5. The enclosure of claim 1, wherein each of the one or more support members is adapted to couple to up to two electronic circuit cards.

6. The enclosure of claim 1, wherein the cylindrical body and the one or more modular card cages are fabricated of a thermally conductive material.
7. The enclosure of claim 1, further comprising one or more spacers adapted to couple to each of the one or more modular card cages and aid in maintaining each of the one or more modular card cages in direct contact with an inner wall of the cylindrical body.
8. The enclosure of claim 7, wherein one of the one or more spaces includes a plurality of fingers that extend downward and outwardly from an upper surface of the one spacer and wherein each of the plurality of fingers engages with one of the one or more modular card cages.
9. An electronics enclosure, comprising:
 - a cylindrical body;
 - one or more modular card cages, adapted to receive one or more electronic circuit cards, including:
 - an outer frame member in thermal contact with an inner wall of the cylindrical body sufficient to dissipate unwanted heat;
 - an inner frame member;
 - one or more support members coupled between the outer frame member and the inner frame member; and
 - a plurality of electronic device retainers adapted to couple to the modular card cage and hold each of the one or more electronic circuit cards in thermal contact with one of the one or more support members;
 - wherein the support members provide an isolated heat dissipation path for heat, produced by each of the one or more electronic circuit cards, to be removed from the enclosure; and
 - one or more printed circuit boards adapted to couple to each of the one or more modular card cages;

wherein each printed circuit board includes one or more connector blocks and a single champ connector;

wherein the one or more connector blocks are each adapted to receive one of the one or more electronic circuit cards.

10. The enclosure of claim 9, wherein the one or more support members comprise one or more wedge shaped support members.

11. The enclosure of claim 10, wherein the one or more wedge shaped support members is hollow.

12. The enclosure of claim 10, wherein the one or more wedge shaped support members is solid.

13. The enclosure of claim 9, wherein each of the one or more support members is adapted to couple to up to two electronic circuit cards.

14. The enclosure of claim 9, wherein the cylindrical body and the one or more modular card cages are fabricated of a thermally conductive material.

15. The enclosure of claim 9, wherein the electronic circuit cards comprise single wide repeaters.

16. The enclosure of claim 9, wherein the electronic circuit cards comprise double wide repeaters.

17. The enclosure of claim 9, wherein the one or more connector blocks each include a keying feature that aids in prohibiting the electronic circuit cards from being inserted incorrectly.

18. The enclosure of claim 9, wherein the one or more connector blocks each include surge protection.

19. The enclosure of claim 9, further comprising one or more spacers adapted to couple to each of the one or more modular card cages and aid in maintaining each of the one or more modular card cages in direct contact with the inner wall of the cylindrical body.

20. The enclosure of claim 19, wherein a first space of the one or more spaces includes a plurality of fingers that extend downward and outwardly from an upper surface of the first spacer and wherein each of the plurality of fingers engages with one of the one or more modular card cages.

21. The enclosure of claim 19, wherein a second spacer of the one or more spaces is adapted to couple to each of the one or more printed circuit boards.

22. An electronics enclosure, comprising:
a cylindrical body having a top opening and a base;
at least one lid adapted to couple to the cylindrical body to form a seal from the environment and against a pressure differential;
a plurality of modular card cages, each card cage adapted to receive one or more electronic circuit cards and including:
a curved outer frame member;
a curved inner frame member;
one or more wedged support members coupled between the outer frame member and the inner frame member; and
one or more electronic device retainers adapted to couple to the modular card cage and form a slot to receive and hold the one or more electronic circuit cards in direct physical and thermal contact with the one or more wedged support members;

wherein the modular card cage is fabricated of a thermally conductive material;
wherein energy produced by the one or more electronic circuit cards is directed out of the electronics enclosure via isolated heat dissipation paths;

wherein the length of each isolated heat dissipation path from the one or more electronics circuit cards to air ambient to the electronics enclosure is substantially equivalent.

23. The enclosure of claim 22, wherein the at least one lid includes a storage system having a holder for tools and equipment.

24. The enclosure of claim 23, wherein the holder includes a retention strap to secure the tools and equipment in place.

25. The enclosure of claim 22, wherein the lid is dome shaped.

26. The enclosure of claim 22, further including a mounting bracket coupled to the cylindrical body.

27. The enclosure of claim 26, wherein the mounting bracket includes a strain relief structure adapted to couple to a stub cable receivable by the cylindrical body and provide strain relief for the stub cable.

28. A modular card cage adapted to couple to one or more electronic circuit cards, comprising:

a curved outer frame member;

a curved inner frame member;

one or more wedged support members coupled between the outer frame member and the inner frame member; and

one or more electronic device retainers adapted to couple to the modular card cage and form a slot to receive and hold one of the one or more electronic circuit cards in direct physical contact with one of the one or more wedged support members;

wherein the modular card cage provides an isolated heat dissipation path for heat produced by each of the one or more electronic circuit cards.

29. The modular card cage of claim 28, wherein the one or more wedged support members are hollow.

30. The modular card cage of claim 28, wherein the one or more wedged support members are solid.

31. The modular card cage of claim 28, wherein each of the one or more wedged support members is adapted to couple to up to two electronic circuit cards.

32. The modular card cage of claim 28, wherein the one or more modular card cages are fabricated of a thermally conductive material.

33. The modular card cage of claim 28, wherein the electronic circuit cards comprise single wide repeaters.

34. The modular card cage of claim 28, wherein the electronic circuit cards comprise double wide repeaters.

35. The modular card cage of claim 28, wherein the one or more electronic device retainers are fabricated of a flexible and resilient material.

36. The modular card cage of claim 35, wherein the flexible and resilient material is spring steel.

37. The modular card cage of claim 28, wherein the one or more electronic device retainers each include a plurality of pressure protrusions that aid in holding the electronic circuit cards in direct physical and thermal contact with the one of the one or more wedged support members.

38. An enclosure comprising:

a plurality of modular card cages adapted to dissipate energy from one or more electronic cards via a cylindrical body of the enclosure, wherein the plurality of modular card cages and the cylindrical body are fabricated of a thermally conductive material;

an electronic device retainer adapted to couple to each of the plurality of card cages and form a slot that is adapted to receive one of the electronic cards, wherein the device retainer forces the electronic card into contact with a support member of the card cage; and

wherein each of the plurality of card cages provides an isolated heat dissipation path from each of the one or more electronic cards to the exterior of the enclosure.

39. The enclosure of claim 38, wherein the electronic device retainer includes a plurality of pressure protrusions that aid in holding the electronic card in direct physical and thermal contact with the support members.

40. The enclosure of claim 38, wherein the electronic device retainer is fabricated of spring steel.

41. A method of extracting heat from a sealed electronics equipment enclosure, comprising:

moving energy produced by one or more electronic cards, enclosed within the electronics equipment enclosure, to the exterior of the enclosure via a modular card cage;

wherein the modular card cage is comprised of a plurality of support members and the one or more electronics cards are each in contact with one of the plurality of support members; and

dissipating the energy to air ambient to the electronics equipment enclosure via the modular card cage.

42. The method of claim 41, further comprising engaging a device retainer with the modular card cage and forcing the one or more electronics cards in contact with one of the plurality of support members.

43. An enclosure, comprising:
a plurality of modular card cages; and
a plurality of device retainers, wherein each device retainer is adapted to couple to one of the plurality of modular card cages and form a slot that is adapted to receive and electronic circuit card;
wherein the device retainer further forces the electronic circuit card in contact with the support member and hold the electronic circuit card in place.

44. The enclosure of claim 43, wherein the device retainer includes a plurality of pressure protrusions adapted to engage with and assist in holding each electronic circuit card in contact with a support member of one of the plurality of modular card cages.

45. The enclosure of claim 43, wherein the device retainer mates with one or more grooves formed in one of the plurality of modular card cages.

46. A method of creating an isolated heat dissipation path, comprising:
thermally contacting one or more electronic circuit cards with a wedged support member of a modular card cage, wherein the modular card cage includes a curved outer member coupled to a curved inner member via the wedged support member;
wherein the wedged support member is substantially perpendicular to both the inner and outer curved members;
encasing the modular card cage within an electronics enclosure;

forcing the modular card cage into thermal and physical contact with an inner wall of the electronics enclosure; and

drawing energy from the one or more electronic cards to the exterior of the electronics enclosure via the modular card cage.

47. A method of manufacturing an electronics enclosure, comprising:

forming a modular card cage adapted to receive one or more electronic circuit cards, wherein the modular card cages includes:

a curved outer frame member;

a curved inner frame member; and

one or more wedged support members coupled between the outer frame member and the inner frame member;

forming one or more electronic device retainers adapted to couple to the modular card cage and form a slot to receive and hold one of the one or more electronic circuit cards in direct physical and thermal contact with one of the one or more wedged support members; and

forming one or more pressure protrusions in the electronic device retainers that are adapted to engage with and force one of the one or more electronic circuit cards in contact with one of the one or more wedged support members.

48. A repeater housing, comprising:

a plurality of modular card cages adapted to couple with one or more repeaters, wherein each modular card cage includes:

a curved outer frame member;

a curved inner frame member;

one or more wedged support members coupled between the outer frame member and the inner frame member; and

one or more electronic device retainers adapted to couple to the modular card cage and form a slot to receive and hold the one or more repeaters in direct physical and thermal contact with the one or more wedged support members;

wherein the modular card cage is fabricated of a thermally conductive material;

wherein energy produced by the one or more repeaters is directed out of the repeater housing via isolated heat dissipation paths created by the plurality of modular card cages.

49. The repeater housing of claim 48, wherein the one or more wedged support members are hollow.

50. The repeater housing of claim 48, wherein the one or more wedged support members are solid.

51. The repeater housing of claim 48, wherein each of the one or more wedged support member is adapted to couple to up to two repeaters.

52. The repeater housing of claim 48, wherein the one or more repeaters are single wide repeaters.

53. The repeater housing of claim 48, wherein the one or more repeaters are double wide repeaters.

54. The repeater housing of claim 48, wherein the one or more electronic device retainers each include a plurality of pressure protrusions that aid in holding the repeaters in direct physical and thermal contact with the one of the one or more wedged support members.